ENVIRONMENTAL ASSESSMENT

PROGRESSIVE GENETICS INTERNATIONAL

FARM SERVICE CENTER

New Kahovka, Kherson Oblast, Ukraine

Under the Auspices of

Citizens Network for Foreign Affairs, Kiev, Ukraine

and the

United States Agency for International Development

Cooperative Agreement No. 121-0006-A-00-6238-00

By

Wayne T. Williams, Ph.D.
Jo Anne A. Williams, B. A.
Lena Lopantseva, M.S.
Zoya Drozdova, B.S.

Citizens Network for Foreign Affairs

14 April, 1998

USAID REGULATION 22 CFR 216.2

TABLE OF CONTENTS

B. Maps of the Region
C. Photo Album of Site
D. Rare and endangered Species in Kherson Oblast
E. Toxicity Data for Pesticides used in the Project
F. Emergency Preparedness Plan
G. Guidelines for Integrated Pest Management

1. SUMMARY

The objective of the Environmental Assessment is to bring the Progressive Genetics International Farm Supply and Service Center into compliance with current and planned environmental regulations of the Ukraine and pertinent regulations of the United States Agency for International Development, 22 CFR Regulation 216.2. The project works with the soybean industry to develop soybean reproduction, multiplication, testing, demonstration farms, developing granaries and satellite hubs in the Kherson Oblast, Ukraine. This EA is based on the Initial Environmental Evaluation, Scope of Work written for USAID, various CNFA/USAID reports and memorandums, on local authorities inspections and several site visits by CNFA personnel.

Primarily the project is a soybean farming operation using selected superior varieties in minimum tillage cultivation. Increasing certified seeds on leased lands will provide increased production of quality seeds in the region. Pesticides, primarily herbicides, are used in these practices. Consequently, safeguards must be taken to insure environmental protection.

1.1 Mitigation Measures and Progress Toward Achieving Mitigation

A. Safe storage of pesticides and soybeans is mandatory. The current warehousing situation is unsatisfactory. The current political situation concerning soybeans has made it difficult for Progressive Genetics to locate adequate warehouse space for the soybeans. After harvest in 1997, soybeans were placed on sheets of plastic in warehouses adjacent to unknown farm chemical spills. Another warehouse has only a dirt floor and is open to the environment. Other harvested soybeans were placed on sheets of plastic, partially covered by plastic and out in the open, exposed to rain, rats, dogs, and birds. This is an unacceptable situation which has a political solution.

USAID Agricultural Chemical Management guidelines must be followed as described in the following two charts. Should the warehouses and Farm Service Center change location during the contract period, the subgrantee must notify CNFA of these plans so that additional environmental assessment can be made and mitigations implemented if necessary.

B. Fire fighting equipment needs to be purchased and installed. The municipal firehouse is within about 5 kilometers distance. Permits and instructions for fire control must be issued, including emergency plans. A suggested emergency plan is attached as Appendix F. It is recommended to put several piles of sand with shovels near the agrochemicals for fire and spill control.

USAID Recommendations for Pesticide Storage

Warehouses and Storage Facilities Must:

1. be located in an area far away from dwellings and surface water and not subject to flooding or shallow water tables;
2. be shaded if possible to help regulate temperature in the warehouse;
3. be fenced, locked, and posted with warning signs;
4. be built of nonflammable materials;
5. have floors of smooth concrete or other impervious material, so that pesticides will not be absorbed;
6. be well ventilated, to avoid buildup of heat and fumes;
7. be surrounded by containment structures (ditches, berms, etc.) to prevent spills from flowing off-site;
8. be well lit;
9. have posted spill management instructions, spill containment and safety supplies (e.g., shovels, sand, brooms, hoses, fire extinguishers), and a water source for spill decontamination;
10. use a ?first in, first out? procedure;
11. store individual chemicals separately, and on pallets;
12. maintain aisles so that all chemicals are accessible;
13. prohibit the storage or consumption of food, tobacco, or drinking water in the warehouse; and
14. make a supply of soap and water for washing available in the warehouse.

Source: USAID 1991

C. Fuels and chemical fertilizers are stored in two locked and secure Pullman train cars on site of one of the Progressive Genetics farms. Herbicides are delivered directly to the farms and used immediately, so there is no long term storage of pesticides.

D. The pesticide application equipment is a wagon sprayer. The operators (individual farmers) need to have training and experience in the application and correct management of pesticides.

E. An inventory of pesticide use and calendars for application should be prepared on the leased farms for each field. Minimum and no-till agriculture as practiced, require the use of herbicides to control weeds. It is considered that the trade-off between the non use of herbicides with traditional deep ploughing methods and soil conservation requiring herbicides rules in favor of soil conservation realized with minimum tillage. USAID guidelines as outlined in the following chart requires mandatory compliance for pesticide application and management and traditional packaging methods..

USAID Recommendations for Pesticide Application

1. The label should be written in the local language.
2. The applicator should follow the directions on the label, including the use of protective clothing and respirators.
3. Never leave pesticides unattended in an unsecured place.
4. Never transfer pesticides to containers other than those designed to hold that pesticide.
5. Never work alone with pesticides.
6. Inspect containers for leaks before moving.
7. Keep food, drink, tobacco, and eating utensils away from the work area.
8. Never eat, drink, smoke, or rub your eyes when handling pesticides.
9. Always have soap and plenty of water available at the work site.
10. Thoroughly wash protective clothing after handling pesticides, separate from other clothing.
11. Dispose of any heavily contaminated clothing.
12. Workers should immediately stop work and wash if pesticide spills on them.
13. Keep unauthorized persons, especially children, away from pesticides.

Source: USAID 1991

F. An Integrated Pest Management approach for pesticide selection is warranted, where the least toxic and least persistent pesticides are to be used first, while other pesticides are to be used only in emergency situations. Spot spraying is to be recommended. This technique is particularly important when using the herbicide Harness (acetochlor) which is a potential carcinogen.

G. All personnel, and many farmer-applicators must be trained in the safe and rational use

of pesticides through the AP-2 project funds allocated to training. The training of farmers in the correct disposal techniques of pesticide packaging is a mitigation for the use of pesticides. As long as the project supplies, uses, or recommends the use of pesticides, all of its pest and pesticide management activities must remain under the supervision of a qualified individual. All pesticides that leave the warehouse should have Russian and/or Ukrainian language brochures specific to the product; or all containers should have translated labels on them. Progressive Genetics should consider contracting with the USAID IPM CRSP graduates to present this information to its clients.

H. Empty and improperly discarded pesticide containers represent a significant and present danger to the environment and human health. Empty pesticide containers are so popular for recycling as containers for various substances in Ukraine, including food, that they have become targets of theft. Empty pesticide containers are notorious sources for poisonings, especially among children and alcoholics. This real problem must be solved, and it is the obligation of the distributor of pesticides, i.e., Progressive Genetics, to formulate a management plan to reduce the risk of accidental poisonings. The training of farmers and appliers and their directors must include instructions on the proper disposal of the containers. Progressive Genetics should verify their success in training by interviewing the farmers about how they actually are progressing with proper container disposal after every harvest cycle. The program of Progressive Genetics of selling the seed bags to the buyers of seed, and then repurchasing them for reuse next season is to commended as a viable and profitable practice to be extended to pesticide containers and returned to the manufacturers in bulk in a safe manner.

I. It is recommended that a soil and watering monitoring baseline study be implemented. Groundwater should be monitored at key sites, annually, to detect any possible leaching of pesticides and fertilizer residues into wells and waterways to identify point source leakage. The project should ensure that local hospital staff are familiar with the symptoms and treatment of intoxication by pesticides that it uses or supplies. A previous USAID/CNFA project, Freedom Farms, met with local hospital staff and this should be repeated. A line item in the budget exists for this reimbursable expense.

J. All varieties of seeds to be used in the project must be identified, and certifications produced as to quality, trueness to variety, freedom from diseases and pests, etc. All licenses and permits or applications therefore pertaining to relevant Ukrainian statues for said project activities must be provided.

K. A letter from Progressive Genetics must be submitted to CNFA indicating the subgrantee**?**s endorsement of the Environmental Assessment as representative of the operations and indicating that the recommendations of the EA will be implemented by the subgrantee.

L. At the end of the project, Progressive Genetics must certify, in writing, that it has complied with the mitigation package.

2. DESCRIPTION OF THE PROJECT

The purpose of this project is to supply soybean and other seeds, fertilizers innoculant and crop protection chemicals to participating farms via an input of credit program. Crop scouting, consulting and education programs on the new varieties of soybeans, fertilizers and other agrochemicals will be provided to the farms. Demonstration plots of new techniques and soybean varietal trials, linked with field days are planned. The main supply center will serve as an anchor to the satellite farms.

Progressive Genetics is a U.S. company 100 percent self financed. The core enterprise is providing soybean genetics and seeds to Ukrainian private farms. In order to adequately provide for their farmers, they have instituted a Farm Supply and Service Center in conjunction with soybean testing, reproduction and demonstration plots. Working with surrounding farms in the Kahovka district they have now 80% of the soybeans seed/genetics market. Most of the farms which are working with Progressive Genetics will increase their land area devoted to soybeans.

Making soybean prices profitable for commercial production is a necessary marketing technique. This will allow the farms to take the necessary steps to become financially improved and economically independent units from the state system. In 1997, the farms have been provided many of the services necessary required for soybean production with $215,000 in production credit (seed @ $120,000 + inoculant @ $5,000 and herbicide @ $90,000). The return to the farms growing these commercial soybeans is estimated at $1.1 million.

A farm supply and service center is a natural compliment for the soybean industry. It can spiral outward and benefit many people. The center will:

1. provide education and consultants demonstrating the system of production and proper usage at several soybean demonstration fields;
2. provide other farms with necessary soybean seeds and proper application consultation, education, demonstration, and production assistance;
3. allow US and Ukrainian agriculturalists to learn the marginal benefits and costs of properly applied inputs in Ukraine;
4. create a demand and market for other US seeds, farm chemicals, machinery etc.;
5. assist and organize marketing of the commercial soybeans to purchase other US inputs and help with harvest, storage and transport of the crop;
6. consult with and organize farms for bartering inputs for many crops and organize the bartered inputs back to the farms from the central storage facility; and
7. multiply the varieties to increase seed and hence commercial soybean production.

BUDGET

USAID?s contribution to the total project cost is $260,655 to be disbursed over a two year period. The funds will be used for: 1) salaries and benefits of U.S. managerial, technical and

training personnel and Ukrainian support staff ($109,575), 2) to purchase training supplies and materials and field days ($44,000), 3) travel and per diem ($70,860), 4) miscellaneous direct costs including telephone, e-mail, postage, stipends, publications, office rent, audit ($26,220), and 5) *$10,000 contingency for environmental mitigation.* Pesticides are not purchased with USAID funds.

3. AFFECTED ENVIRONMENT

3.1 Project Location and Description

There are four sites of warehouse storage. The office and headquarters are located in the town of Nova Kahovka. There are 16 collective farms and 7 private farms using the new technology as of 14 Oct. 1997 in the Kherson Oblast plus satellite locations at Kahovka, Novotroisk, Genichsic, Crimea, Poltova, Sumi and Odessa..

3,2 Land Under Cultivation

Twelve to 15 soybean varieties are being used imported from the United States. Approximately 4500 ha are devoted to soybeans with 575 ha specifically for seed increase. All soya is under irrigation from the giant centrally planned irrigation system. Yield increases are estimated at 10 cn/ha. Soybean varieties include Agassiz, Evans and Lambert which are short season soybeans plus Parker and Hardig, two mid-to long season types. The general rotation is soya-wheat-barley-sunflowers. Varieties are being tested for resistance to diseases, season length and tendency to avoid shattering**.** Farm machinery in 1997 was mostly imported from the United states and includes one Massey Furgenson combine, one Ukrainian combine, one tractor, a planter, a wagon sprayer, a semi truck a disk a cultivator and center pivot irrigation equipment.

3.3 Physical Environment

The climate of the southern Ukrainian steppe is moderately continental. In the lower Dnipro River area, the minimal and maximum rainfall is between 200 and 650 mm per year with 360 mm being the average, with more than one third of it during summer. This is the lowest water availability in all of Ukraine. Agriculture must consequently rely on the Dnipro River for a consistent water supply. Summers are hot with evaporation exceeding five to six times the precipitation dropping the relative humidity to as low as 7 per cent. Maximum summer temperatures can reach 40 C with winter lows down to minus 34 C below zero. Snow falls only in December thinly covering the earth and by the middle of March it is gone. The average growing season is 224 days with a long frost free period of up to 7.5 months. There are two kinds of soils. In the south a dark brown, sandy soil dominates. In the north there is a slightly saline black chernozem. Subsoils are sandy and water tables are salty at about 3 m depth and less salty at 10 m depth. Wind is a deciding factor in this steppe climate bringing light warm southerly winds to cold gusting winds from the north-east. This wind causes late spring frosts and droughts in the

summer. Due to the moisture situation, ploughing in the fall instead of the spring is recommended to increase moisture.

Cultivation of the steppe has been the cause of extermination of many plants and animal species. Between the Dnepr and Molozhnaya Rivers, the topography is very flat and more than 92% is under some form of cultivation. Much of the remaining native vegetation is drought resistant, offering a valuable genetic stock.

Ponds, shallow depressions or hollows, are periodically submerged by spring rain and natural occurring springs. These ponds hold patches of rich vegetative biodiversity.

3.4 Biological Environment

There are over 400 plant species. Sod-type grasses are predominant with endemic plants of the Black Sea plain also being present creating a never ending vista of grasses. A partial list includes the following species:

A. Vegetation

Grasses and flowers

Sheep?s fescue, Lessing feather grass, steppe sedge, bluegrass, Ukrainian feather grass, yellow alfalfa, vetch, flowering rushes, lake reeds, tulips, motley irises, absinth, cow?s lungwort (bear?s ear), Russian thistle, goat?s beard, carnations, blue wheat grass, goldilocks, steppe camomile, foxtail, sea lavender, alcaria, branching larkspur, meadow Saxifraga.

Shrubs and trees

Wild almond, steppe acacia, tick seed, Summer cypress

Endangered (E) or rare (R) species

Hairy feather grass, *Stipa capillata* (E), Dnepr feather grass, *S. borysthonica* (E), Ukraine lyesinga, *S. ukrainica* (E), lyesinga, *S. lessingiana* (E), and Jersey orchis, *Orchis palustris* (R). (Source: Green Book of Endangered Species of Ukraine, an extension of the Red Book of the USSR).

B. Animals

Mammals

Extinct

Aurochs, wild ass, tarpan (wild horses), saigaks, Red deer, steppe marmots (reintroduced in 1934 and more recently).

Surviving today

Fox, pole-cat, marten, coon dog, hares, jerboas, hamsters, gophers, musk rat, and field mouse.

Birds (16 species)
Larks (steppe, short-toes, thick-billed, horned), quail, white tailed eagles, big cormorant, herons (big and white, small, yellow), Mute swan, gray goose, gray duck, coot, water hen, black kite, partridge, and whiskered tit.

Reptiles and Amphibians
Marsh turtle and water snake

Endangered (E) or rare (R) species
Steppe Eagle, *Aquila rapax* (E), white-tailed sea eagle, *Haliaeetus albicilla* (E), great bustard, *Otis tarda* (E), black winged stilt, *Himantopus himantopus* (R), four-striped rat snake, *Elaphe quaatvorlineata* (R), steppe viper, *Vipera ursini renardi* (E), greater noctule, *Nyctalus lasiopterus Schreber* (R), lesser noctule, *N. leiserli* (R), steppe ferret, *Mustella evesrmanni* (R), and sand mole-rat, *Spalaax arenarius* (R). (Source: Green Book of Emdangered Species of Ukraine, an extension of the Red Book of the USSR). Refer to Appendix D for further details.

4. ENVIRONMENTAL CONSEQUENCES

Progressive Genetics is a soybean farming operation under irrigated conditions for the most part. Several new, registered soybean varieties have been imported. Farming in the traditional way and without minimum tillage techniques carry inherent impacts to the environment, especially with the use of heavy farm machinery and agrochemicals over a large acreage. Minimum tillage as used in the project, is considered to be a positive step towards soil conservation and fuel savings. As currently practiced, minimum till must however, be accompanied by herbicide increases for weed control. Considering the economic crisis, massive soil resource depletion occurring with traditional tillage, and the significant increase of high quality vegetable protein produced by project activities, the technique is environmentally sound. Linked with farmer-applicator training and a monitoring program, the project should be able to not only improve agriculture in the Oblast, but mitigate foreseeable problems with farm chemicals.

One unforeseen problem occurred in the project when a ?shatter resistant? variety of soybean was planted in northern Ukraine in the northern Sumy Oblast. The variety shattered and the crop was lots. Due to extreme nutrient shortages all due caution must be taken to avoid such losses through prudent demonstration plots.

4.1 Pesticide Use on Soybeans

Weeds are the limiting factor for minimal tillage. Russian Thistle are a serious problem since the thistle seed is carried in irrigation water as the irrigation ditches are lined with thistles.

Timely availability of herbicides is another limiting factor. Harness from Monsanto, Pivot (0.8 l/ha) from American Cyanamid (post emergence), Basagran for thistle reduction are applied at two liters per hectare dosages each. If Harness is used correctly, Pivot will not need to be used. The use of intensive hand labor for weeding reduces the amount of pesticides needed. Progressive Genetics hires 13 people for 3 weeks to weed by hand. This program is to be highly recommended as an alternative to heavy use of herbicides. We also recommend spot herbicide applications in order to reduce costs and amounts of herbicides applied while maintaining good yields. The use of crop protection chemicals by the project will continue to have the potential to negatively impact applicator health, as well as the environment. It was related to the authors that the villagers are sensitized to the safe use of pesticides.

Table 4.1.1: Technical Specifications of Herbicides for soybeans on the Progressive Genetics International Farm Service Center, New Kahovka, Kherson, Ukraine

Product Name	EPA Registration	EPA Toxicity Category				Personal Protective	Environmental Indicators				
		Oral (1)	Inhalation (1)	Dermal (1)	Eye (1)	Equipment & Handling (2)	Fish LC50 (3)	Bird (3)	Leaching (4)	Absorption (4)	Carcinogenicity
Harness (H) (*Acetochlor*)	Restricted Use	III	I	II	I	I	.0451 .3 mg/l	50 mg/l	M	S	Possible human carcinogen & tubular degeneration of the testes & hypospermia
Basagran	Restricted Use	III		III			PNT	720 mg/kg	very much		Avoid contaminating water
Pivot (H) (Imidazolinone)	Conditional Use	IV	I	III	IV	II	ST	PNT			

1. Toxicity Rankings:
   - I. Danger e.g., oral LD50 <50 mg/kg
   - II. Warning e.g., oral LD50 - 500 mg/kg
   - III. Caution e.g., oral LD50 500-5000 mg/kg
   - IV. Caution e.g., oral LD50 >5000 mg/kg

2. Personal Protective Equipment and Clothing
   - I. Coveralls, long-sleeve shirt, chemical resistant footwear, gloves, respiratory protection, protective eyewear
   - II. Coveralls, short-sleeve shirt, chemical resistant footwear, gloves, respiratory protection, protective eyewear
   - III. Long-sleeve shirt and long pants, socks and shoes, chemical resistant gloves
   - IV. Long-sleeve shirt and long pants, socks and shoes, chemical resistant gloves

3. VHT Very Highly Toxic MT Moderately Toxic
   HT Highly Toxic ST Slightly Toxic
   T Toxic PNT Practically Non-Toxic

4. L Large S Small
   M Medium ES Extra Small

Reasonable estimate from range of values

Source: Adapted from Farm Chemical Handbook, 1995

4.2 Integrated Pest Management Approach

Progressive Genetics uses a no-till or minimum till approach to the fields and farms where soybeans are grown. The judicious use of herbicides and fertilizers has resulted in significant yield increases of high quality soybeans. This is achieved, in part, by the intensive use

of hand labor to weed the fields. The use of intensive hand labor for weeding reduces the amount of pesticides needed. Progressive Genetics hires 13 people for 3 weeks to weed by hand. This program is to be highly recommended as an alternative to heavy use of herbicides, and Progressive Genetics is attempting to keep herbicide use to minimum levels necessary to control weeds.

4.3 Quality and Quantity of Potential Effluents

4.3.1 Fertilizer Use

The fertilizer being applied is Ammophos fertilizer (11-32-0 NPK). However, the availability of fertilizer remains a major problem. Progressive Genetics receives the fertilizer from the state collectives which may or may not supply fertilizers at the right time, resulting in varied significant increases in yields. When fertilizers arrive at the Progressive Genetics warehouses, there is only a very short storage period as the farmers are notified and fertilizers are applied as soon as feasible after being received. The farmers who have contracted with Progressive Genetics are being trained in the proper use, application, and storage of fertilizers. Inadequate use of fertilizers will result in lower yields, and can have deleterious effects on soil structure and plant metabolism, as described in the GAME EA under the AP-I Project..

4.3.2 Fuel Use and Fire Control

Improper fuel storage and storage tank selection can result in contamination of soil and groundwater. Fuel is stored on the collective farms, and Progressive Genetics has two converted Pullman train cars for pesticide storage and some fuel storage capacity (photo album in Appendix C). Progressive Genetics doesn?t want to advertise the presence of its agrochemicals through warning signs since theft of agrochemicals is rampant and well organized in the oblast.

4.4 Quality and Quantity of Air Emissions

Air emissions arise from the transfer of chemicals from storage tanks to sprayers and fuel tanks on vehicles, during operation of motors on various vehicles and farm machinery, evaporation from spills, should they occur, dust produced from tilling the earth during cultivation, and travel on dirt roads and tracks. These emissions are not abnormal and should not cause significant negative impacts.

4.5 Quantity and Quality of Solid Wastes and Potential Impacts from their Disposal

The selection of technologies to be employed in the project are not expected to generate significant wastes.

4.6 Potential Noise Levels from Facility

There are few if any negative impacts from noise arising from this project.

4.7 Effects on Aesthetics and Visual Quality

This does not apply to the project.

4.8 Ability of Local Community or Government to Provide Emergency Response Services

Nova Kahovka is only a few km from the farms to adequate medical facilities.

4.9 Identification of Potential Contaminant Migration Pathways of Possible Environmental Releases and Potential Receptors

This item was fully described in the GAME AP-I EA.

4.9.1 Fertilizers

Fertilizers are acquired from the collective farms where land is rented by Progressive Genetics and thus subject to availability by the state system of allocation. Excessive fertilization is not considered to be a problem at this time in Ukraine. When excessive fertilization does occur, both economic and environmental resources are wasted. Overuse of fertilizers burns crops. Extra nitrogen sublimes or washes out of the soil to nearby waterways. Near urban areas, ammonium and nitrate ions can be partially responsible for ozone formation in the atmosphere, as well as creating acid precipitation. The ammonium ions from the fertilizers react with urban pollutants to form acids which lower the pH of precipitation. Run off of fertilizers from fields in heavy rainfalls contaminates wells and waterways. These pollution pathways have resulted in regional wide poisoning of water supplies with nitrates and nitrites in many parts of the world. Nitrogen and other fertilizers escaping from farmlands cause algal blooms which suffocate aquatic life forms, odor problems and create habitats for disease vectors.

Soybean crop inserted into current rotation has many environmental advantaged:

1) Breaks the current rotation cycles +life cycles of various pests. This result in less pesticide usage in future crops.

2) Soybeans leave a significant amount of nitrogen for the following crops. (30-50% of crop needs). This natural source results in less commercial fertilizers required and fewer problems resulting from commercial fertilizers such as leaching.

3) Controlling weeds in soybeans and change in rotation controls weed spread and subsequent weed seed for future years. This shall result in less herbicide usage in future years.

4.9.2 Pesticides

Herbicides are usually shipped directly to the farms from the suppliers. They are used immediately upon arrival. Therefore there is very little storage of farm chemicals in the warehouses. However, the practice of using empty pesticide containers for many other things is not safe and should be stopped immediately. A deposit fee for all agrochemicals leveed by the chemical companies, and the organization of a collection system by them is warranted to assure the return of the containers to the companies thus avoiding possible poisonings and ecosystem contamination. CNFA is working with the farm chemical industry in Ukraine to establish safe container management.

.

4.10 Impact on Water and Power Supplies

No impacts are foreseen. Water quality will be periodically monitored. Buffer zones around waterways of no-till areas is required by Ukraine.

5. LIST OF PREPARERS

Dr. Wayne Williams is currently the Environmental Officer for Citizens Network for Foreign Affairs projects in Kiev, Ukraine. He received his doctorate from the University of California, Davis in Plant Pathology. He has extensive experience in the Environmental Assessment field, successfully completing several dozen Environmental Assessments for USAID in Central America from 1991 through 1995 in his capacity as Regional Environmental Advisor for USAID/ROCAP in Guatemala. Dr. Williams has completed many Environmental Assessments on agriculture in Ukraine under the AP- I and II projects. These and other Environmental Assessments completed by Dr. Williams covered the widest possible range of topics, including Integrated Pest Management, pesticide analysis, agricultural production, medical clinics construction, solid and liquid waste disposal, public health and other projects including large and medium sized industrial operations, including electrical power generating plants. He has conducted extensive agricultural research on plant nutrition with macro and micro nutrients and varietal trials. Jo Anne Williams has a Bachelors degree in Environmental Studies and Planning from Sonoma State University, California. She has had extensive experience in writing and editing scientific and technical manuscripts. She is a contractor for the CNFA Environmental office. **Lena Lopantseva, Environmental Assistant for Citizens Network for Foreign Affairs projects in Kiev, Ukraine. Lena Lopantseva has a Masters Degree in Physics with a Minor in Science Education. She is an Environmental Technician for CNFA.** Zoya Drozdova has a Bachelors degree in chemistry from Kiev National University and extensive experience in environmental impacts analysis.

6. BIBLIOGRAPHY

? Ministry of Agriculture, USSR. Krasnaya Kniga SSR (Red Book of the USSR), 1985 (2 Vol.).

? Askaniya Nova Preserve, Guidebook, 1978.

? Environmental Closure Report. Freedom Farms Black Sea Model Post-Harvest Grain System. Food System Restructuring Project. Co-op. Agreement No. CNN-0006-A-00-3033-00.

? Environmental Assessment. GAME Farm Service Center. Sumy Oblast, Ukraine. Oct. 8 1997. 24 pp. plus 10 appendices.

APPENDICES

A. Original IEE and Scope of Work
B. Maps of the Region
C. Photo Album of Site
D. Rare and endangered Species in Kherson Oblast
E. Toxicity Data for Pesticides used in the Project
F. Emergency Preparedness Plan
G. Guidelines for Integrated Pest Management